

Fig. 1

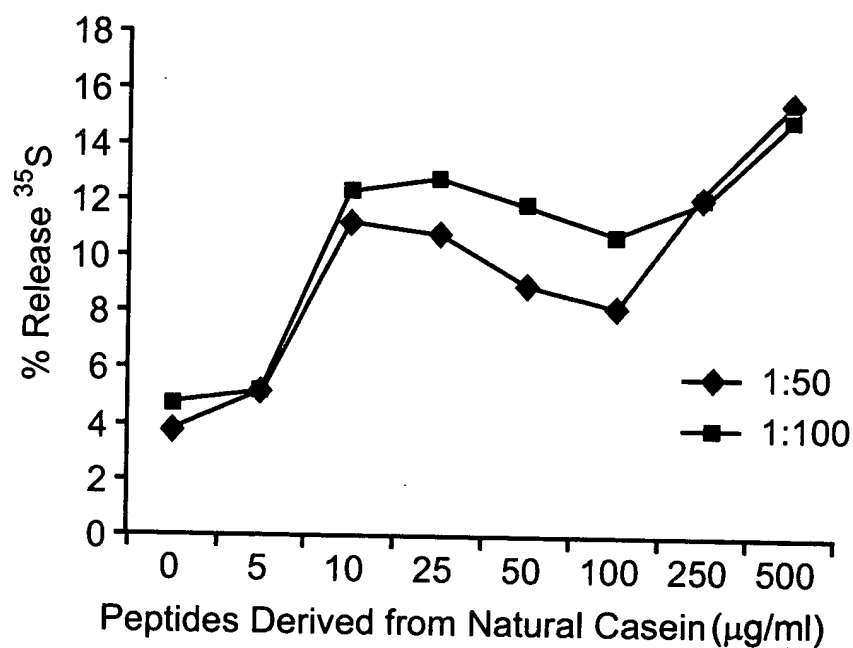


Fig. 2a

Selective Stimulation of Human Natural Killer (NK)  
Cell Activity by Peptides Derived from Natural Casein

Patient	Type	0	10	25	100	250	500
1	Normal	13	15	15	12	13	15
2	NHL	10.1	13.8	14.3	-	15.8	13.7
3	NHL	3.5	10.4	8.4	10.8	-	-
4	Br. Ca.	4.2	2.7	7.1	7.7	5.9	10.1
5	-	12.2	18.1	19.1	14.3	13.4	15.8
6	-	17	15	15	15	13	9

Fig. 2b

Peptides Derived from Natural Casein Stimulate  
 Proliferation of Human CD<sub>56</sub> Surface Antigen Positive (NK) Cells

		NK Cell Proliferation % FLCD <sub>56</sub>
Patient	Control	Peptides Derived from Natural Casein
1	0.60	0.20
2	0.60	1.90
3	0.10	0.90
4	0.40	3.30
5	1.50	3.70
Mean	0.64	2.00
SD	0.52	1.50

EFFECT OF PEPTIDES DERIVED FROM NATURAL  
 CASEIN ON NK PROLIFERATION

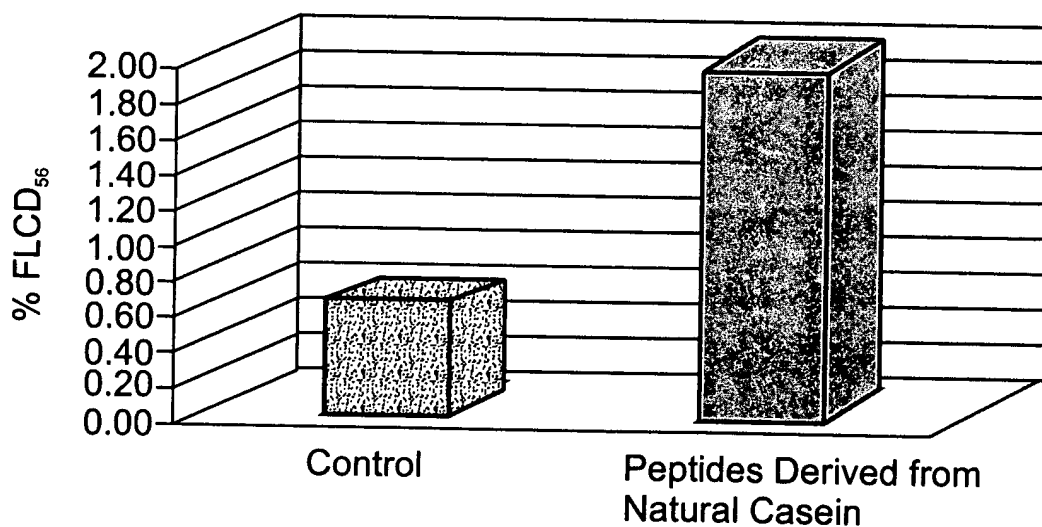


Fig. 3a

Peptides Derived from Natural Casein Stimulate  
 Proliferation of Human CD<sub>3</sub> Surface Antigen Positive (T) Cells

		NK Cell Proliferation % FLCD <sub>3</sub>
Patient	Control	Peptides Derived from Natural Casein
1	7.90	10.40
2	8.19	10.46
3	12.82	58.64
4	62.86	50.44
5	5.49	47.76
Mean	19.45	35.54
SD	24.41	23.27

EFFECT OF PEPTIDES DERIVED FROM NATURAL  
 CASEIN ON T CELL PROLIFERATION

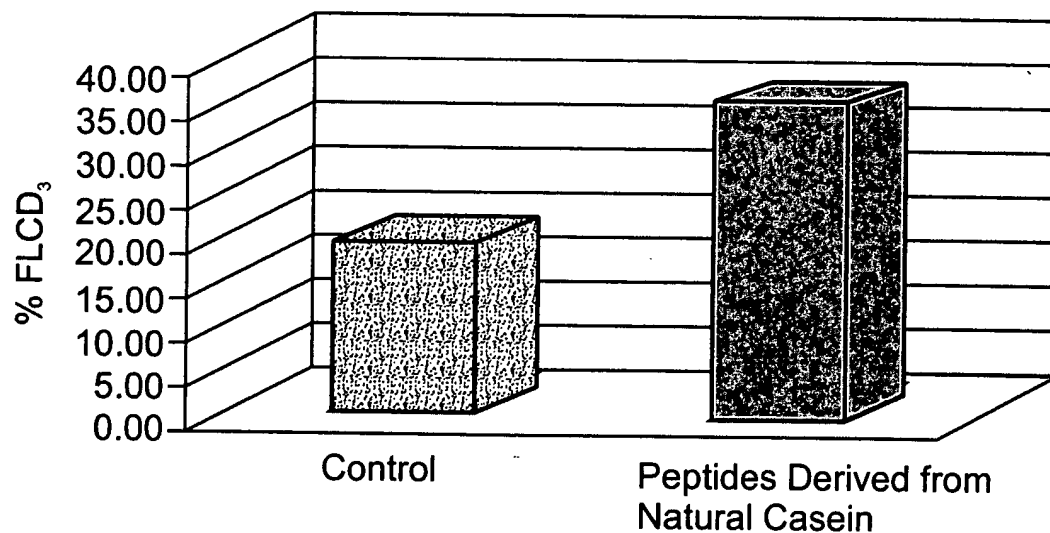


Fig. 3b

Peptides Derived from Natural Casein Stimulate  
 Proliferation of Human CD<sub>56</sub> and CD<sub>3</sub> Surface Antigen Positive  
 (NK/T) Cells

		NK Cell Proliferation % FLCD <sub>3</sub> /FLCD <sub>56</sub>
Patient	Control	Peptides Derived from Natural Casein
1	8.00	25.00
2	1.1	4.3
3	0.1	0.85
4	2.77	3.89
5	1.74	4.34
6	0.84	4.53
7	0	2.55
Mean	2.08	6.49
SD	2.78	8.27

EFFECT OF PEPTIDES DERIVED FROM NATURAL  
 CASEIN ON PBSC PROLIFERATION

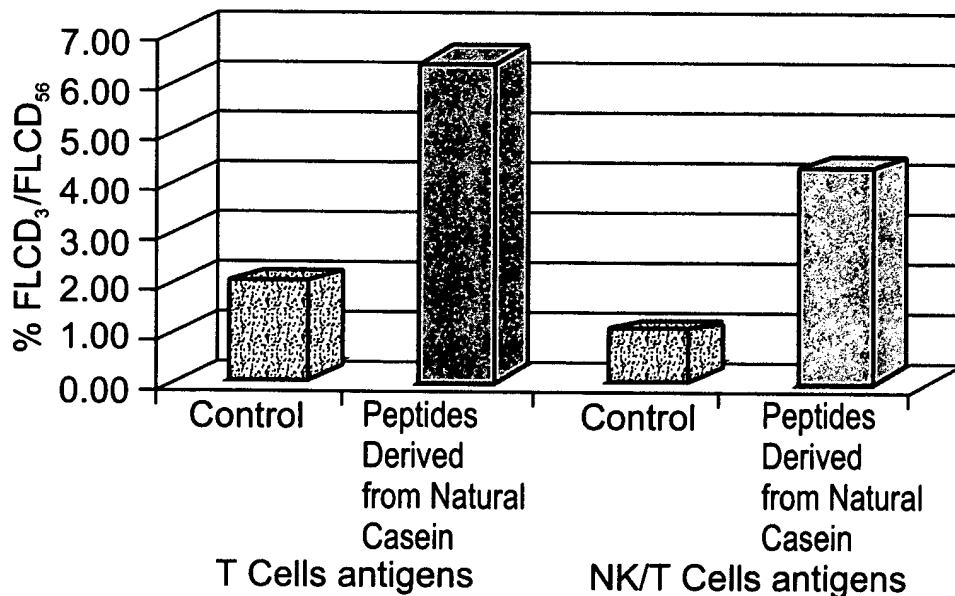


Fig. 3c

NK Cells Activity (% <sup>35</sup> S Release )									
0 µg/ml	10 µg/ml		25 µg/ml		100 µg/ml		250 µg/ml		500 µg/ml
4.3 %	1880	7.3%	1803	6.2%	2006	9.2%	1761	5.6%	1768
4.3 %	1762	5.6%	1908	7.7%	1840	6.7%	1805	6.2%	1883
4.3 %	2003	9.1%	1868	7.1%	1847	6.8%	1671	4.2%	1997

PEPTIDE 1a SEQ ID 9  
PEPTIDE 2a SEQ ID 10  
PEPTIDE 3a SEQ ID 11

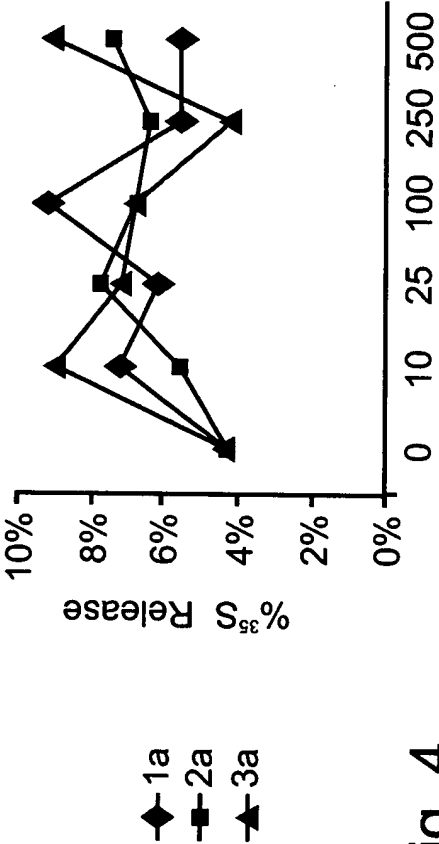


Fig. 4  
ug/ml Synthetic Peptides derived from αS1 Casein

Stem Cell Proliferation (T <sup>3</sup> H)		Peptides Derived from Natural Casein				
		Control	50 ( $\mu$ g/ml)	100 ( $\mu$ g/ml)	300 ( $\mu$ g/ml)	600 ( $\mu$ g/ml)
Blood origin	Incubation period (days)					
PBSC	20	1663	3007	1800	4306	3310
PBSC	15	741	1612	784	-	920
BM normal	21	675	-	660	834	817
BM Auto	21	945	-	916	1537	1284
BM 1	21	1829	4217	4396	9178	1446
BM 2	21	1829	5039	2939	1496	-
CB1	14	1159	1191	1694	3961	3297
CB2	14	3434	-	10882	-	13560

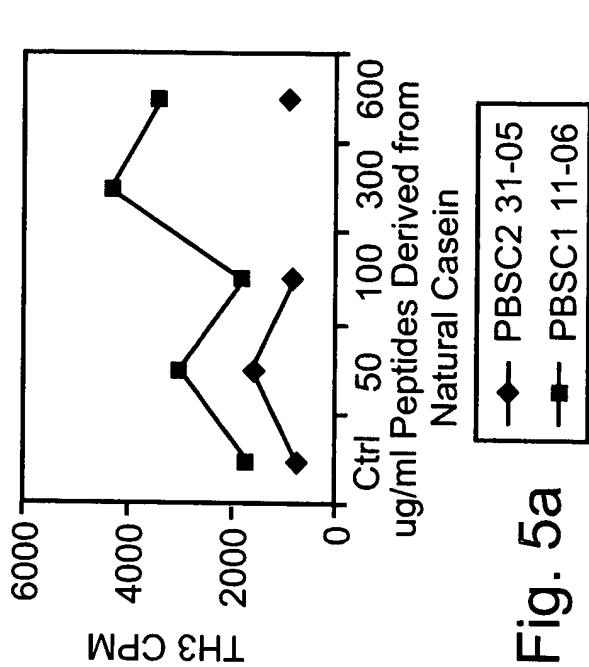


Fig. 5a

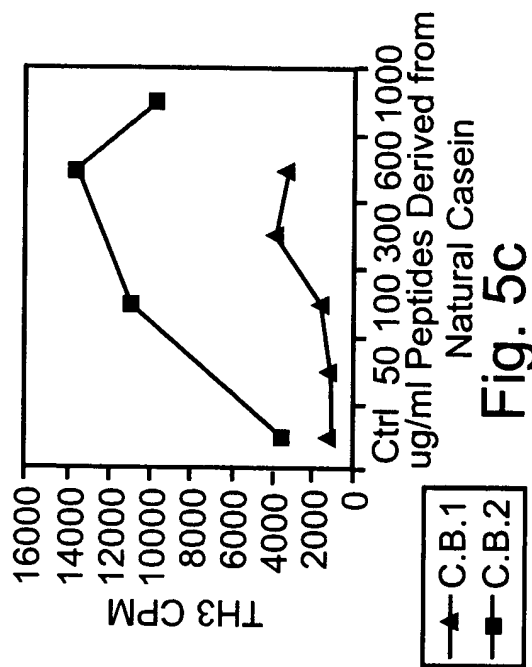


Fig. 5c

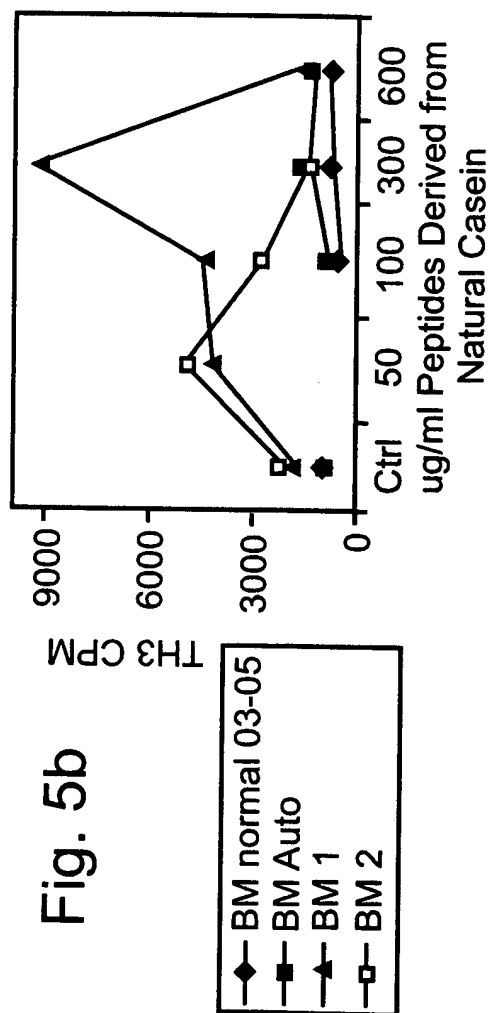


Fig. 5b

Peptides Derived from Natural Casein Stimulate  
Proliferation of Normal Human Hematopoietic  
Cells

Donor	Days Of Incubation	Factors Added	Relative Cell No. X 10 <sup>4</sup> /ml $\mu$ g Peptides Derived from Natural Casein/ml				
			<u>0</u>	<u>25</u>	<u>100</u>	<u>250</u>	<u>500</u>
Bone Marrow	14	EPO, hIL-3, hSCF,AB serum	41	64	-	67	51
Cord Blood	13	EPO, hIL-3, hSCF,AB serum	27	158	66	50	-

Fig. 6



**Synthetic Casein-Derived Peptides**  
**Effect of Peptide Length on Relative Cell Distribution (Differential Count)**  
(%)

Identification	PEPTIDES LENGTH	CONC. (µg)	MP	PMN	EARLY MK	LATE MK	TOTAL MK	EARLY RBC	LATE RBC	TOTAL RBC	PLASMA CELLS	DENDRITIC CELLS	EOS BAS	MITOSES	TOTAL
74	2	25	17.8	2.6	3.5	3.7	7.2	15.8	20.4	36.2	8.3	23.0	2.8	4	544
1P	3	25	11.3	2.9	8.8	5.4	14.2	16.5	38.6	55.1	6.7	7.5	2.3	9	521
2P	4	25	6.1	2.3	7.4	9.1	16.5	19.4	51.8	71.2	-	-	0.6	4	700
3P	5	25	12.9	1.8	16.0	16.9	32.9	18.9	23.4	42.3	2.2	7.4	0.5	2	551
4P	6	25	22.0	3.1	21.6	24.6	46.2	5.7	11.5	17.2	0.1	4.5	4.6	4	842
5P	7	25	30.1	9.0	7.8	7.5	15.3	12.9	12.8	25.7	2.4	14.0	3.5	5	744
X	9	25	30.0	6.6	5.6	3.0	8.6	16.4	18.5	34.9	0.5	15.2	4.3	2	762
2a	11	25	8.6	1.6	14.2	28.9	43.1	13.5	26.5	40.0	3.0	3.0	0.6	12	931
2a	11	250	8.4	0.9	19.4	19.8	39.2	12.6	35.0	47.6	2.2	0.5	1.2	11	651
3a	12	25	9.5	1.8	24.1	22.5	46.6	14.0	23.4	37.4	-	3.7	1.0	16	779
D	16	25	41.0	4.5	7.0	7.6	14.6	9.6	20.2	29.8	3.4	-	6.8	7	471
Control (without synthetic peptides)															

Fig. 7

Identification	PEPTIDES LENGTH	CONC. (µg)	Mφ		PMN		EARLY		LATE		TOTAL		EARLY		LATE		TOTAL		RBC		PLASMA		DENDRITIC		EOS		MITOSES		TOTAL	
			Mφ	PMN	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK	MK
D	16	250	26.6	4.8	11.9	19.4	31.3	4.2	13.1	17.3	12.3	2.4	4.5	6	620															
E	17	100	15.4	5.1	12.9	14.5	27.4	20.5	23.6	44.1	4.5	1.4	2.2	7	552															
E	17	1250	7.0	2.1	12.7	19.2	31.9	15.2	36.2	51.4	3.2	0.7	3.8	11	759															
F	18	25	17.8	4.8	14.5	19.3	33.8	8.6	24.3	32.9	7.2	-	3.4	9	580															
F	18	250	9.9	6.1	18.3	19.5	37.8	15.0	27.9	42.9	2.2	0.5	0.6	13	791															
G	19	25	19.9	9.7	14.4	17.0	31.4	8.8	15.3	24.1	9.7	-	5.2	5	659															
H	20	25	12.8	3.3	17.0	31.2	48.2	15.4	17.6	33.0	1.8	0.6	0.4	11	826															
I	21	25	19.2	9.0	11.9	30.0	41.9	7.9	20.9	28.8	1.4	-	-	8	708															
J	22	25	15.0	4.5	13.2	14.0	27.2	18.9	28.4	47.3	4.0	0.2	1.8	15	952															
K	23	25	28.6	14.9	3.9	6.5	10.4	3.2	-	3.2	6.5	14.3	22.1	1	154															
L	24	25	10.4	3.6	18.9	36.8	55.7	10.3	12.2	22.5	4.6	2.2	0.9	14	768															
N	26	100	13.8	3.6	13.6	16.4	30.0	12.4	14.2	26.6	1.5	19.8	4.6	14	675															
control (without synthetic peptides)			17.4	1.6	12.4	10.6	23.0	13.1	44.0	57.1	0.3	0.1	0.2	10	686															

Fig. 7 (Continued)

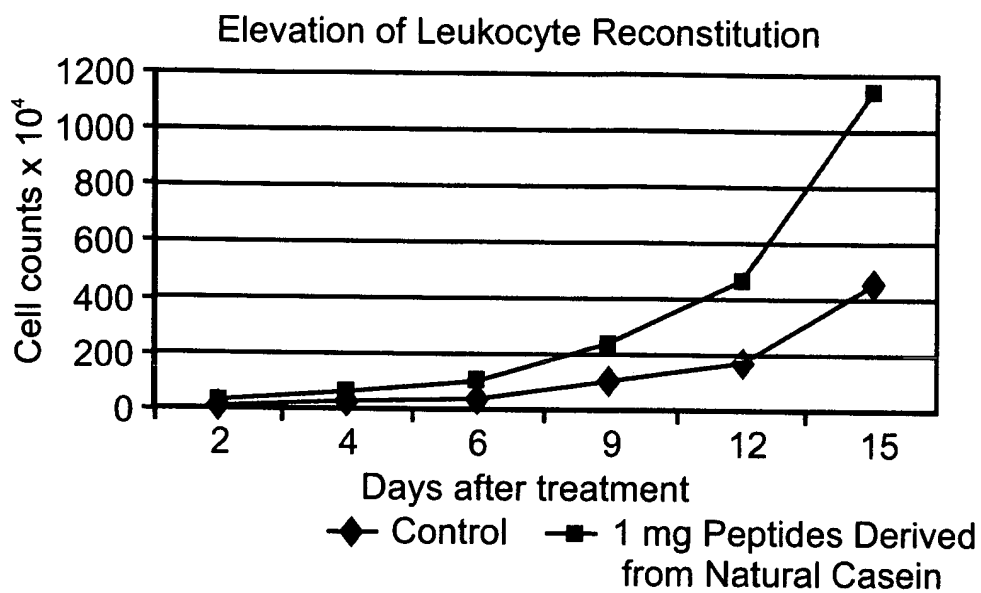


Fig. 8

Peptides Derived from Natural Casein Stimulate Thrombocyte Proliferation in Irradiated, Bone Marrow Reconstituted CBA Mice.

Thrombocyte Proliferation (PLT  $\times 10^3$ )

	11 Days after treatment		13 Days after treatment		15 Days after treatment	
	Control	Peptides Derived from Natural Casein	Control	Peptides Derived from Natural Casein	Control	Peptides Derived from Natural Casein
1	43	50	75	103	98	110
2	48	54	71	105	99	128
3	68	68	80	110	102	111
4	64	64	104	104	96	103
5	67	67	91	101	104	133
6	63	54	90	90	97	114
7	54	45	104	107	87	104
8		63		104		116
9		61		93		115
10		57		116		112
Mean	58.14	58.3	87.86	103.3*	97.57	114.6**

\*  $p < 0.01$     \*\*  $p < 0.0001$

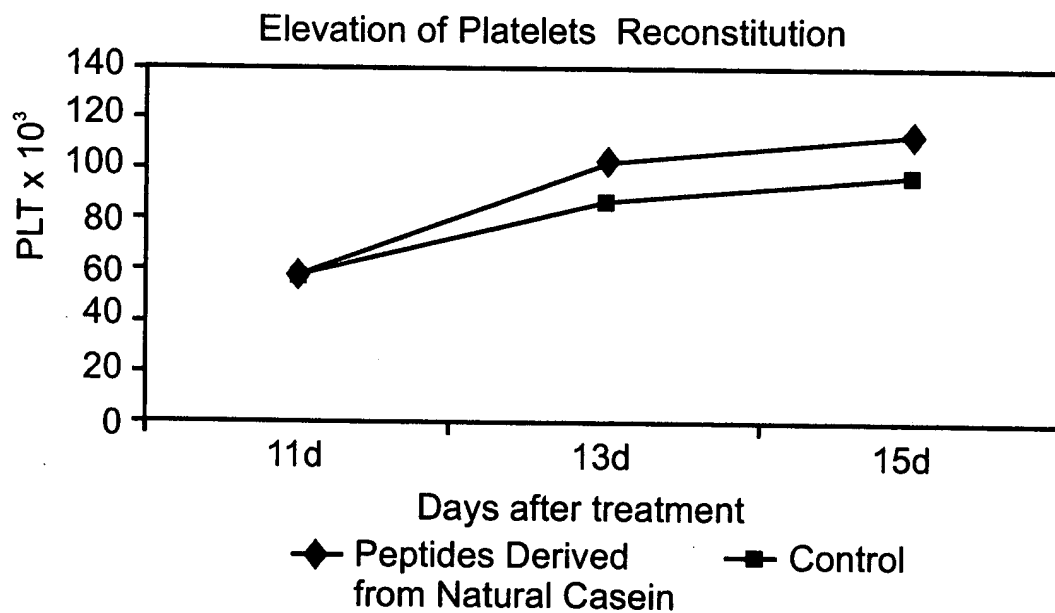


Fig. 9

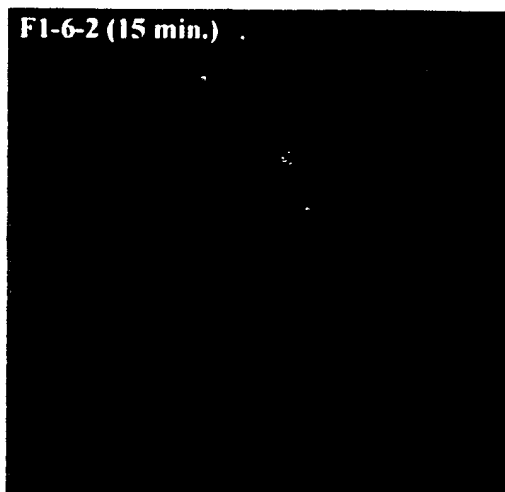


Fig. 10a

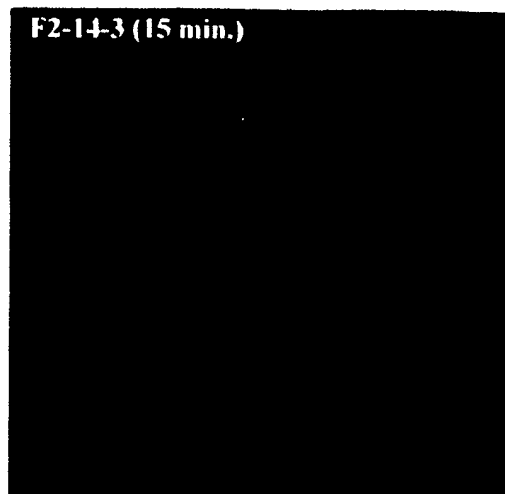


Fig. 10b

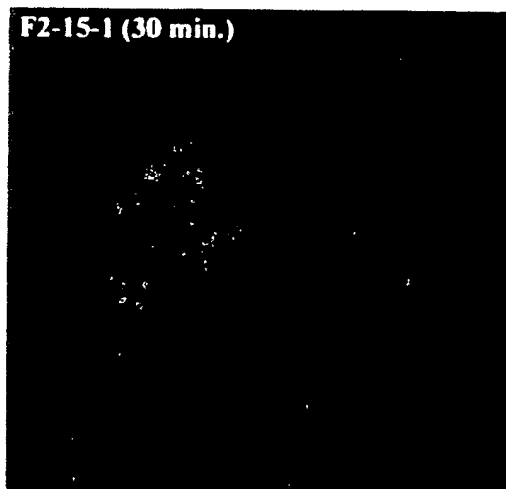


Fig. 10c

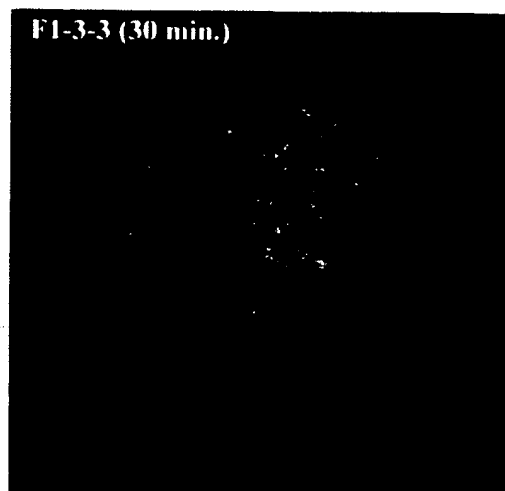


Fig. 10d

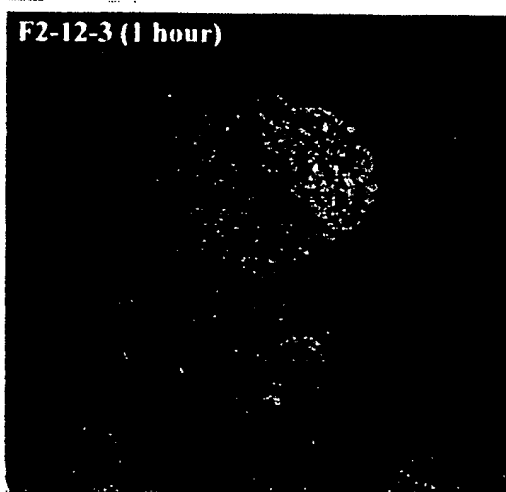


Fig. 10e

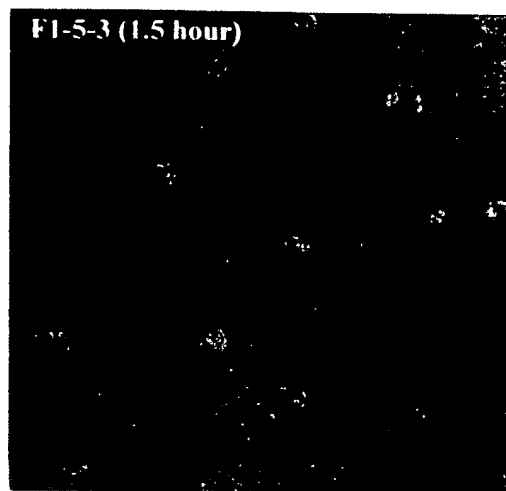


Fig. 10f

**Stimulation of Sup-T<sub>1</sub> Lymphocyte Cell Proliferation by  
Peptides Derived from Natural Casein**

Peptides Derived from Natural Casein $\mu$ g/ml	3 days		7 days	
	cpm Counts	Lymphocyte Proliferation Index	cpm Counts	Lymphocyte Proliferation Index
50	9268	1.18	120954	1.10
100	9940	1.26	112436	1.02
300	8425	1.07	102957	0.93
600	9771	1.24	101987	0.93
1000	8390	1.06	86649	0.79
Control	7862		109560	

Peptides Derived from Natural Casein $\mu$ g/ml	10 days		14 days	
	cpm Counts	Lymphocyte Proliferation Index	cpm Counts	Lymphocyte Proliferation Index
50	17695	1.03	22272	1.36
100	19168	1.12	22842	1.40
300	21806	1.28	15318	0.93
600	22826	1.34	17368	1.06
1000	21764	1.28	10034	0.61
Control	17046		16313	

**Fig. 11**

Peptides Derived from Natural Casein Inhibit of HIV-1 Infection  
 of CEM Cells: Cell Proliferation vs. P<sup>24</sup> Antigen Levels

	Peptides Derived from Natural Casein μg/ml	CEM cells	
		Cell No. (x10 <sup>6</sup> ) 15 days	P <sup>24</sup> Ag ng/ml
3H	50	0.29	16.39
	100	0.55	7.73
	300	0.54	1.61
	600	0.75	0.18
	1000	0.57	0.19
24H	50	0.40	0.24
	100	0.48	4.21
	300	0.56	2.94
	600	0.62	0.18
	1000	0.79	4.03
48H	50	0.37	10.05
	100	0.50	9.16
	300	0.56	3.21
	600	0.70	16.49
	1000	0.84	2.16
Control	IF	0.35	11.42
	UIF	0.42	0.17

Fig. 12

**Synthetic Casein-Derived Peptides Inhibit HIV-1 Infection  
 of CEM Cells: Cell Proliferation vs. P<sup>24</sup> Antigen Levels**

Peptide (3 hr. pretrea- tment)	Conc. μg/ml	CEM cells	
		Cell No (x10 <sup>6</sup> ) 7 days	P <sup>24</sup> Ag ng/ml
1P (SEQ ID No. 3)	100	1.29	0.17
	500	2.01	0.14
3P (SEQ ID No. 5)	10	1.17	0.26
	25	1.26	0.18
4P (SEQ ID No. 6)	25	1.26	0.42
	100	1.00	0.14
	250	1.59	0.10
Control	IF	1.06	0.52
	UIF	0.42	0.17

**Fig. 13**



Peptides Derived from Natural Casein Prevent  
Onset of Type I Diabetes in Non-Obese Diabetic Mice.

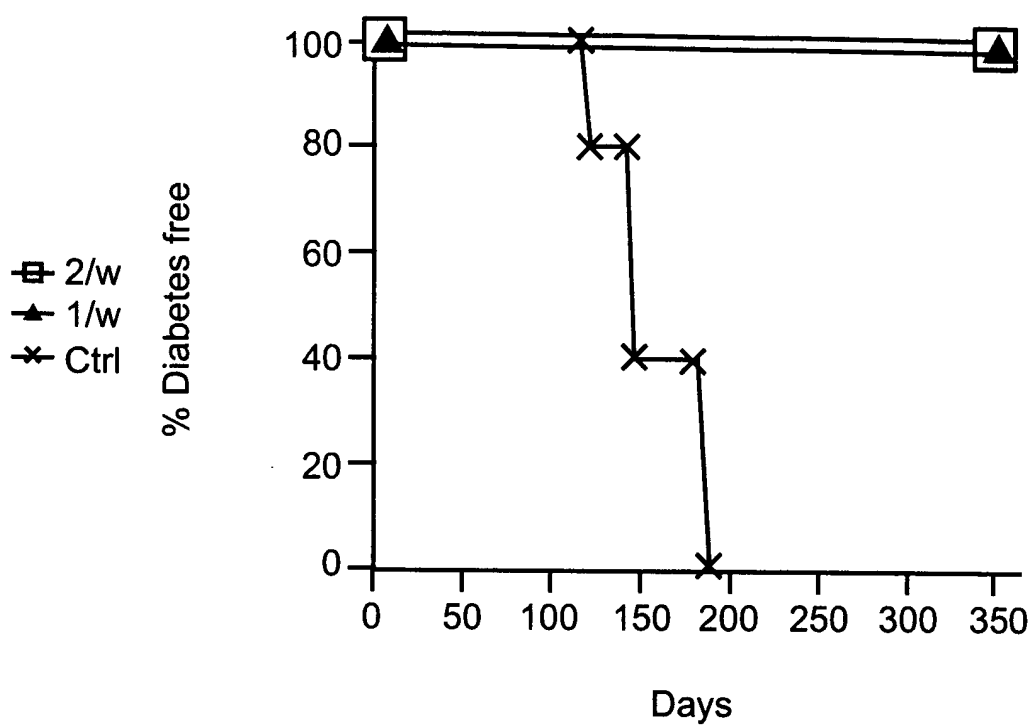


Fig. 14

Total Cholesterol (TC), LDL & HDL levels in  
 Hypercholesterolemic/Hyperlipidemic C57 BI/6J

Sample*	Group**	Food	TC	HDL		LDL
1	Normal	Normal	91	44	48	<1
2		Normal	92	51	56	<1
3	Control	Enriched	375	53	58	305
4		Enriched	411	46	51	348
5	B	Enriched	442	47	52	372
6		Enriched	445	38	42	386
7	C	Enriched	409	47	52	341
8		Enriched	411	34	37	361
9	2a	Enriched	279	33	36	229
10		Enriched	278	43	47	213
11	3P	Enriched	312	38	42	251
12		Enriched	305	39	43	243

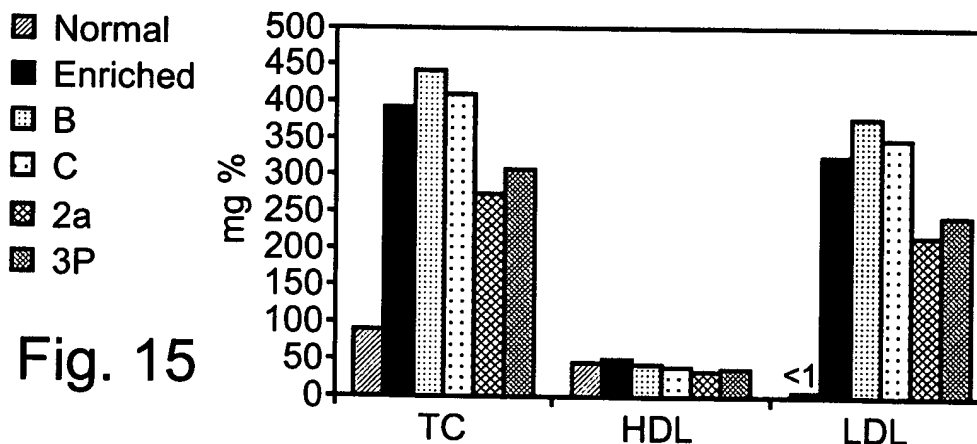
\* One Blood Sample Represents Blood Drawn from 2 Mice.

\*\* Each Group Included 4 Mice.

MEAN VALUES

		TC	HDL	LDL
1+2	Normal	91.5	49.75	<1
3+4	Control	393	52	326.5
5+6	B	443.5	44.75	379
7+8	C	410	42.5	351
9+10	2a	278.5	40	221
11+12	3P	308.5	40.5	247

Cholesterol, HDL & LDL in C57 BI/6J  
 Treated with Peptides



Effects of Peptides Derived from Natural Casein on Cancer Patients Hematopoiesis

Patient	WBC		PLT		RBC		HGB	
	before	after	before	after	before	after	before	after
1	1,200 n	4,100 n+241%	17,000 n	224,000 n+1217%	3.27 n	4.05 n+23%	10.4 n	12.6 n+21%
2	5,400 n	6,300 n+16.6%	204,000 n	259,000 n+26.9%	3.37 n	3.46 n+2.6%	10.8 n	11.0 n+1.8%
3	3,400 n	5,100 n+50%	12,700 n	17,900 n+40%	4.49 n	4.71 n+8.4%	12.9 n	13.2 n+2.3%
4	4,900 n	6,400 n+30%						
5	700 n	4,600 n+557%	47,000 n	151,000 n+221%	2.88 n	3.45 n+19.7%	8.6 n	10.5 n+22%

WBC = White blood cells  
 PLT = Platelets  
 RBC = Red blood cells  
 HGB = Hemoglobin

Fig. 16

Peptides Derived from Native Casein Stimulate  
Thrombocytopoiesis in Acute Myeloid Leukemia (Patient M-1)

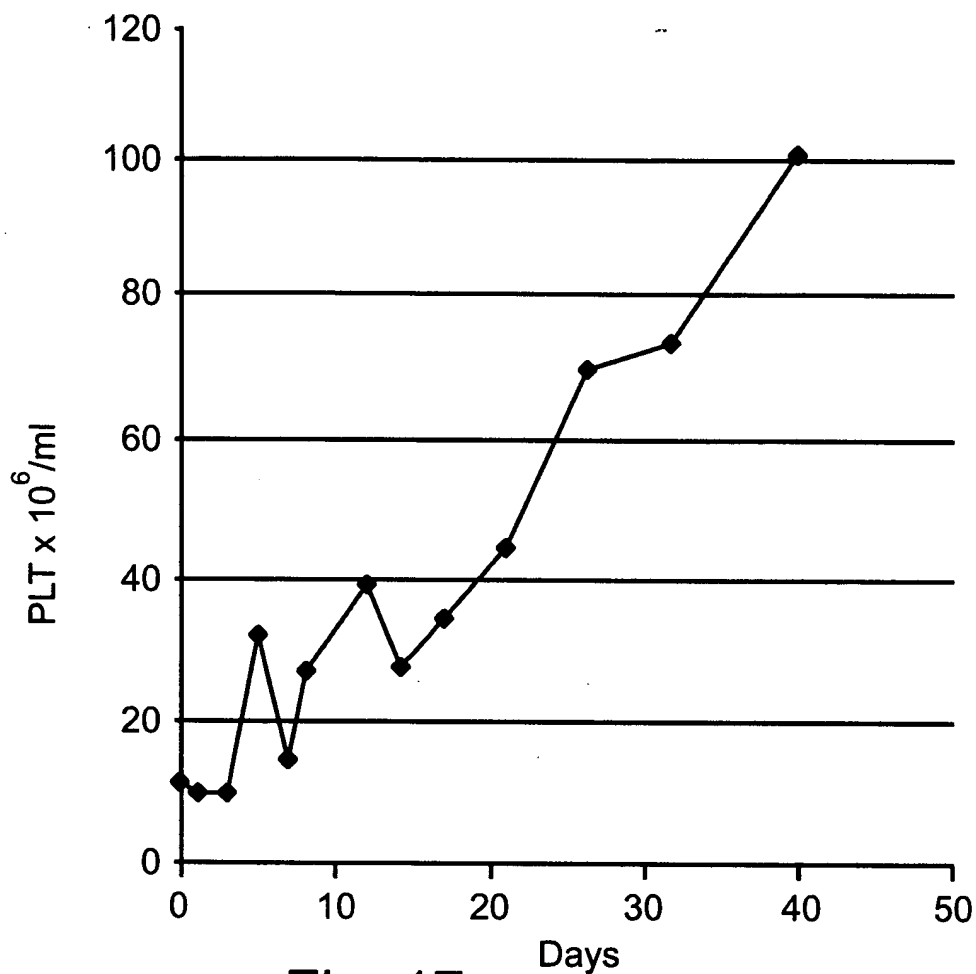


Fig. 17

Peptides Derived from Native Casein  
Stimulate Thrombocytopoiesis in Acute  
Myeloid Leukemia (Patient M-2)

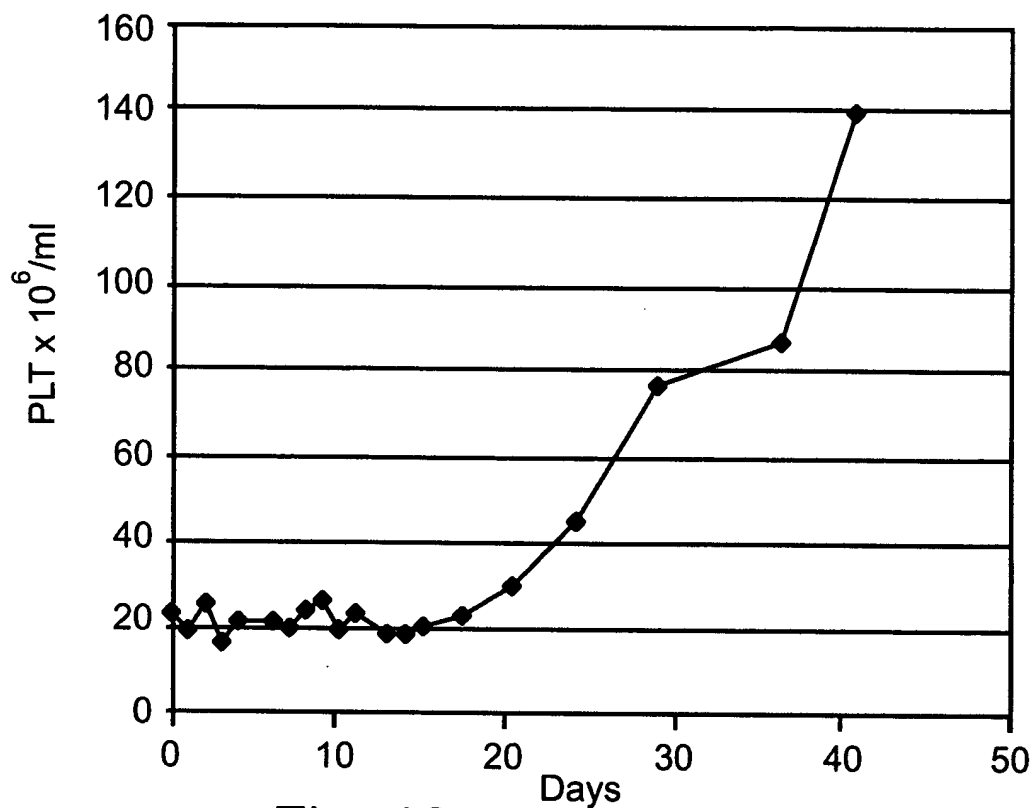


Fig. 18